## REMARKS

Applicants' counsel thanks Examiner Vo for her continued careful examination of the present application. Applicants' counsel also thanks the Examiner for the very helpful and courteous telephone interview conducted February 8, 2006. The substance of the interview is discussed below in the context of the following remarks.

In the last Office action, the Examiner maintained her Section 102 rejections of claim 1 over both Donzis and Krent. Applicants respectfully traverse the rejections.

In the Office action, the Examiner reiterated her position that both Donzis and Krent disclose a viscoelastic foam. To support this position, the Examiner has cited two new references, namely "Information in Flexible Polyurethane Foam" and "Specialty Foam and Composites." The Examiner has argued that both of these references "evidence that viscoelastic foam is a type of open cell, flexible polyurethane foam which has ability of absorbing shock." Then the Examiner explains:

> This is exactly what is taught in the Donzis reference. Donzis teaches the use of the flexible open cell polyurethane foam for shock absorbing as shown in figure 9. Therefore, it is not seen that the flexible open cell polyurethane foam could not have been a viscoelastic foam so as to have ability to absorb shock as the viscoelastic foam of the present invention.

Office action, p. 4.

But this argument is flawed because it assumes that all open-cell flexible polyurethane foams that are capable of absorbing shock *must be viscoelastic foams*. This is simply not true. The vast majority of flexible polyurethane foams that have been on the market over the past several decades in fact are not viscoelastic; i.e. they do not exhibit slow-recovery following deflection. Instead, they are elastic (instant-recovery) foams that nonetheless are both flexible and capable to absorb shock. For an example based in common experience, the Examiner's attention is directed to most furniture seating cushions (sofas, armchairs, etc.). The vast majority of these are made with conventional elastic polyurethane foam that does not exhibit slow-recovery hysteresis. That is, sofa cushions (most of them, such as the ones in the undersigned's family room) recover without delay after the load has been removed. Yet they are effective to absorb shock, lest the undersigned's four-year old son would be seriously injured from his habit of repeatedly jumping face-first onto the sofa.

The Examiner's own reference, "Information in Flexible Polyurethane Foam," points out that viscoelastic foams have been very sparsely used, despite the availability of technology to make them. See the first page of that reference: "Although viscoelastic foam production technology has been available for more than 35 years, commercial products have only recently been made widely available to consumers."

Even assuming the newly cited references disclose certain *viscoelastic* open-cell flexible polyurethane foams, this does not mean that **all** open-cell flexible polyurethane foams are viscoelastic. In fact, the vast majority of such foams historically have been elastic (instant recovery). Turning to Donzis, it is true this reference teaches a foam core constructed of an open cell polyurethane foam (col. 4, lns. 63-64). But nowhere does Donzis disclose that foam is a viscoelastic polyurethane foam. Quite the opposite, it is clear the foam core in Donzis is elastic and not viscoelastic. To understand this, reference is made to col. 6, lns. 40-52. Here it is explained "the rate at which air is drawn into cavity 76 [which houses the polyurethane foam core 78] and thus the rate at which the volume of the cavity increases, is again determined by the number and size of the apertures 80." Conversely, for a viscoelastic foam as-claimed, the rate of recovery would be determined not by the number of apertures 80 in the surrounding enclosure 74 alone, but also by the rate of recovery (slow-rebound recovery) of the foam core 78 itself. Were the foam core in Donzis a viscoelastic foam, then the resulting shock absorbing structure 70 could not expand any faster than the rate at which the encapsulated foam core expands. Thus, clearly the foam in Donzis is not necessarily a viscoelastic foam. Nor does that reference fairly suggest using a viscoelastic foam, particularly considering "Information in Flexible Polyurethane Foam," cited by the Examiner, which points out that viscoelastic foams have been sparsely used.

The Examiner has made the identical rejection based on Krent. See Office action, p. 6, which uses nearly identical language to reject claim 1 over Krent as was used for the rejection over Donzis. The very same arguments and reasoning as above apply equally to Krent. While it is true, as the Examiner has noted, Krent discloses an "open cell flexible urethane foam," col. 7, ln 7, nowhere in Krent is it disclosed or remotely suggested this foam is viscoelastic. Nonetheless, the Examiner has relied on the same reasoning as for Donzis to suggest the newly cited references, "Information in Flexible Polyurethane Foam" and "Specialty Foam and Composites," evidence that the open cell polyurethane foam in Krent must be viscoelastic. Again, for the same reasons as above, this simply is not so. The prior art does not disclose or

suggest a viscoelastic foam in combination with a skin having a plurality of vent holes provided therein, as recited in claim 1.

During the telephone interview, the Examiner suggested Applicants submit a declaration from an expert explaining why Donzis and Krent do not disclose viscoelastic foams. However, it is believed the foregoing arguments are sufficiently supported by the Examiner's own references and that no expert declaration is necessary. The Donzis and Krent references simply do not disclose that any polyurethane foam in either of them is viscoelastic. Nor can it be fairly said that any polyurethane foam in these references must inherently be viscoelastic, at least because "Information in Flexible Polyurethane Foam" teaches that the use of viscoelastic foams has been quite limited until very recently. The facts that elastic polyurethane foams are available and widely used, such as in the couch-cushion example above, and are far more prevalent than viscoelastic polyurethanes, mean Donzis and Krent cannot be said to inherently require the polyurethanes in those references must be viscoelastic, absent some objective teaching in either of them to that effect. The Examiner has pointed to no such teaching, other than to compare the properties of being 'open-cell' and 'flexible' to two other references to suggest that the presence of these properties = viscoelastic. For reasons already explained, this simply is not the case.

During the interview, the Examiner suggested the foams in both Donzis and Krent must be viscoelastic in order to perform as described, to absorb shock. But as already explained above (sofa-cushion example), this is not true either. Elastic (instant recovery) foams also can absorb shock. They just do it through a different mechanism. For a thorough explanation of the different mechanisms of energy (shock) absorption for different classes of foams, including elastic foams and viscoelastic foams, the Examiner's attention is respectfully directed to the remarks contained in Amendment "A" filed August 31, 2005 (cert. of mailing) beginning at the bottom of page 6. As also explained there, fully viscous (non-recovering) foams also can absorb shock, through yet a different mechanism. For example, conventional expanded polystyrene, which is the energy-absorbing foam of choice in the vast majority of bicycle helmets, is a rigid, fully-viscous foam that does not recover following an impact; instead it is irreversibly crushed. Yet it is very effective to absorb impact force or "shock" under certain types of loading applications, such as high-velocity impacts to the head. Thus, it should be clear, both from these remarks and those in Amendment "A" referred to above, that non-viscoelastic foams also can absorb shock, even though they do so by different mechanisms.

In view of the foregoing, it is respectfully submitted that the rejections of claim 1 over both Donzis and Krent have been overcome because neither of those references teaches or suggests a viscoelastic foam.

Both claims 9 and 31 depend ultimately from claim 1 and further recite that the foam is semi-rigid foam. Thus, according to both these claims the foam is both semi-rigid *and* viscoelastic. (Claim 9 includes additional limitations on the foam as well). These claims stand rejected as being anticipated by both Donzis and Krent on the same ground as claim 9 in the prior Office action. That ground essentially is that if two foams are polyurethane and have the same density, and one of them is semi-rigid, then the other must be semi-rigid as well. More specifically, the Examiner has argued that because Dera evidences a semi-rigid polyurethane foam with a density of 2 to 7 $lb/ft^3$, and both Donzis and Krent disclose polyurethane foams having densities within the same or a similar range, then both Donzis and Krent must disclose semi-rigid polyurethane foam.

The Applicants have previously pointed out (in Amendment "A") that density is not *per se* related to rigidity. It was further pointed out in Amendment "A" that the Examiner's attempt to reconcile the contradictory teachings of Krent and Dera (former teaches a "flexible" foam, and the latter a "semi-rigid" foam) was incorrect, and actually proved the foams in the two references were not the same, despite the fact they had similar or overlapping densities. (See argument beginning at the middle of p. 10 of Amendment "A"). Nonetheless, the rejection was maintained.

In response to the maintenance of this rejection, the undersigned contacted one of the inventors, who is an expert in foams, and asked him to prepare two polyurethane foam samples having the same density but with different rigidity characteristics. The inventor complied and prepared two different samples of polyurethane foam having the same density, but with one of them being flexible and the other being semi-rigid. Applicants' counsel offered during the interview to demonstrate these samples for the Examiner, and remains willing and able to do so. The fact remains there are potentially thousands, perhaps millions, of different possible combination of polyols, polyisocyanates, catalysts, blowing agents and other components that can be used to prepare polyurethane foams, and numerous examples can be prepared having the same or similar density but vastly dissimilar rigidity. That two references (such as Krent and Dera) disclose polyurethane foams having similar density does not even imply they must have

the same or nearly the same rigidity; one can be flexible while the other is semi-rigid or rigid. This is proven by the samples prepared by the inventor mentioned above, which the undersigned remains willing to demonstrate for the Examiner. (During the telephone interview, the Examiner declined a personal interview to view the samples).

In the interview summary mailed February 15, 2006, the Examiner appears to have withdrawn from her prior position that density relates *per se* to rigidity, as she acknowledged the applicants' above argument is true. But then she stated in the interview summary this argument is not commensurate in scope with the claims because the claims do not specify a composition for the semi-rigid viscoelastic foam. Respectfully, this misses the point. Applicants' argument that two foams can have different rigidity yet the same density is not meant to distinguish any particular foam composition from a claimed composition. The applicants have not claimed any composition. So the applicants do not and cannot assert the scope of any such composition to distinguish prior art. Rather, the above argument is intended to point out the flaw in the Examiner's rejection; namely that just because Krent and/or Donzis may disclose a polyurethane foam having a density similar to one reported in Dera, this does not mean Krent's and/or Donzis's foam is semi-rigid like Dera's foam. Consequently, the Examiner's conclusion that Krent and Donzis both teach semi-rigid foams, just because they share common or similar densities with Dera, is patently false. The Examiner appears to have acknowledged this in the interview summary.

Because claims 9 and 31 are not limited to any particular composition for a semi-rigid viscoelastic foam, they embrace *any* semi-rigid viscoelastic foam when used in combination with the other structural elements in those claims. The applicant has disclosed at least one composition for producing such a foam, but others are known. The point is that the prior art knows of no structure wherein a viscoelastic foam is employed in combination with the other recited elements in claims 9 and 31, respectively. Therefore, this structure is patentable irrespective of the particular composition used to produce the foam in a particular example of the invention. It is the semi-rigid[1] and viscoelastic (slow-recovery hysteresis) properties of the foam, in combination with the other recited elements, that are important to the invention, and not necessarily the particular composition used to produce an example semi-rigid viscoelastic foam. The composition of the semi-rigid viscoelastic foam is not critical, so long as the resulting foam

[1] The "Information in Flexible Polyurethane Foam" reference refers to the rigidity of a foam as its 'firmness.'

exhibits those properties. Another way to look at it is that applicants are claiming a protective layer having a certain type of foam (i.e. that has certain properties) in combination with other elements, and ***not*** a composition of matter for the foam. An analogy might be to consider a claim directed to a car with rubber tires, irrespective of the composition of rubber used for the tires. If a car with rubber tires is novel and non-obvious, then the claim is patentable. The same is true here.

In summary, neither Krent nor Donzis discloses a semi-rigid foam. Nor is it correct to conclude these references must disclose a semi-rigid foam just because their foams may fall within the same or similar density range as Dera. Accordingly, it is respectfully submitted that at least claims 9 and 31 are independently allowable for the foregoing reasons.

Thus, claims 1, 9 and 31 are now believed in condition for allowance. No amendments have been made to the claims, and the foregoing remarks merely clarify and expound on arguments already of record. Hence, nothing herein should require the Examiner to undertake a new search. Therefore, entry of this Amendment after final and allowance of the application are respectfully requested. Otherwise, should the Examiner be of a mind to continue to reject the claims, entry hereof is nonetheless requested because no amendments have been made, and the foregoing arguments clarify the applicants' positions of-record, and thus will present a more complete case on appeal.

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Respectfully submitted,
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